Requirements Definition Report Prepared for

Marine Corps Systems Command

Requirements Analysis for Automation of the Performance Evaluation System

3 January 2002

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Introduction

The United States Marine Corps (Marine Corps) uses the fitness report (FITREP) as the primary means for evaluating a Marine's performance to support the Commandant's efforts to select the most qualified personnel for promotion, augmentation, resident schooling, command and duty assignments. Accurate and timely completion of fitness reports is a critical responsibility of every reporting official—Marine and Non-Marine. Currently, the FITREP completion process is supported by the Performance Evaluation System (PES) managed by the Personnel Management Support Branch (MMSB) at Headquarters Marine Corps.

PES provides for the periodic reporting, recording, and analysis of the performance and professional character of Marines in the grades of Sergeant through Major General. Its fundamental concepts are accuracy, accountability, simplicity, and consistency of policy and evaluation methods. The purpose of PES is to support the centralized selection, promotion, and retention of the most qualified Marines of the Active and Reserve Components. PES also aids in the assignment of personnel and supports other personnel management decisions as required.

Due to various inefficiencies (described in later sections) in the current PES system, Marine Corps Systems Command (MARCORSYSCOM) contracted Gartner to identify the high level functional and technical requirements for an automated performance evaluation system. This report identifies the high level functional and technical requirements of an automated PES to make the evaluation process more effective and efficient.

Performance Evaluation Process

The completed FITREP is the most important information component in manpower management. It is the primary means of evaluating a Marine's performance. The fitness report is the Commandant's primary tool available for the selection of personnel for promotion, retention, augmentation, resident schooling, command, and duty assignments. Therefore, the completion of this report is one of an officer's most critical responsibilities. Inherent in this duty is the commitment of each reporting senior and reviewing officer to ensure the integrity of the system by close attention to accurate marking and timely reporting. Every officer serves a role in the scrupulous maintenance of this evaluation system, ultimately important to both the individual and the Marine Corps.

Evaluation Cycle

The evaluation cycle begins with the Marine reported on (MRO) and the Reporting Senior (RS) developing a clear understanding of the RS's expectations. At the beginning of the reporting relationship, the MRO and the RS meet to establish and formalize a billet description for the MRO that focuses on the essential elements of the MRO's billet in specific and concise terms.

Prior to the end of the reporting period, the MRO provides a summary of accomplishments to the RS. The summary of accomplishments provides the MRO an opportunity to highlight significant events, awards, and professional military education (PME) accomplishments of which the RS may not be aware. The CMC directs the use of the MRO worksheet for billet description and summary of accomplishment documentation.

As the officer/supervisor closest to the MRO, the RS is directly responsible for the Marine's daily taskings and supervision. The RS is in the best position to observe the Marine's performance and character. This immediate officer/supervisor relationship applies equally to both operating and supporting establishments. The RS must establish and clearly convey duties and responsibilities to the MRO and observe, evaluate, and accurately report on the Marine's performance, professional qualities, and potential. RS responsibilities include:

- Provide in-depth observation of the MRO's performance, professional qualities, and potential. RS's should pay particular attention to Marines at remote locations and on special assignments to ensure accurate evaluations of these Marines.
- Establish and formalize or review section B (Billet Description) at the outset of each reporting period; determine or make necessary adjustments; and counsel the MRO on his or her duties, responsibilities, and the RS's expectations.
- Review the MMSB website (https://www.mmsb.usmc.mil/) at a minimum within the first 30 days the MRO is assigned to the RS and on each reporting occasion thereafter to ensure the accuracy of the reporting period and to identify any fitness report date gaps.

- Accurately complete sections A through I (appropriate marks and justifications) and the RS's certification in section J-1.
- Forward fitness reports to the RO in a timely manner.

The RO completes his or her portion of the evaluation and reviews the report, ensuring it is accurate and administratively correct. As the critical link in the reporting chain and the key to the viability of the PES, RO's must provide the experienced leadership, supervision, and detached point of view necessary to ensure consistent, accurate, and unbiased evaluations. Reviewing officers must ensure adherence to policy and, as the last officer/supervisor in the normal reporting chain, are responsible for all subordinate performance evaluation activities. The RO must focus on eliminating inflated marks, and unwarranted and unclear comments. After completing their section ROs must forward the report to the CMC (MMSB-32).

The Personnel Management Support Branch reviews the report for adherence to policy and correctness, then processes and files it in the MRO's OMPF, thus completing the cycle.

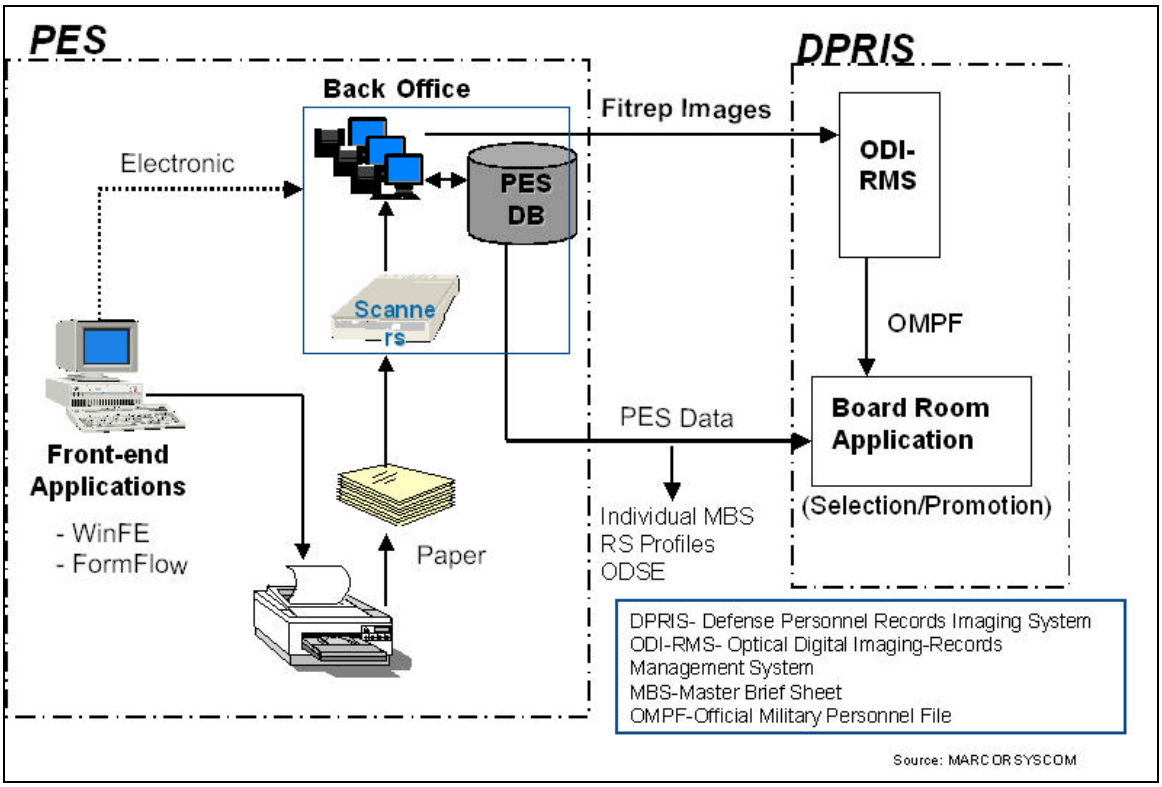
The third action officer must sight all adverse fitness reports. He/she must take actions to resolve inconsistencies and disagreements when MRO's attached statement disagrees with the RO and validate the information provided by MRO.

In cases where both RS and RO are non-Marines, the fitness report must go through an additional administrative review.

Current Performance Evaluation System (PES)

PES comprises the policies, procedures and responsibilities for the preparation, processing and maintenance of FITREP. Reports must provide accurate and complete profiles of the professional qualities of Marine. The PES application set is a family of stand-alone and client/server applications which support the preparation, processing, and integration of PES data and images. PES is divided into two major applications, Windows Front End (WinFE) and the Back Office. The Windows Front End (WinFE) supports fitness report creation at the reporting officials end. The Back Office operations consist of two major operations, (a) scanning of the fitness reports, (b) policies and procedure verification.

Figure 1. Current PES Operation Overview



PES Windows Front End

PES Windows® Front End (PES WinFE) is the component application used by reporting officials to prepare FITREP at the reporting unit level. WinFE has built-in business rules and help functions to assist reporting officials in correctly completing fitness reports for submission to MMSB. WinFE is designed to operate as a stand-alone application, and is compatible on

Windows95, Windows98®, and WindowsNT 4.0® operating systems. Testing is underway for compatibility with Windows2000®.

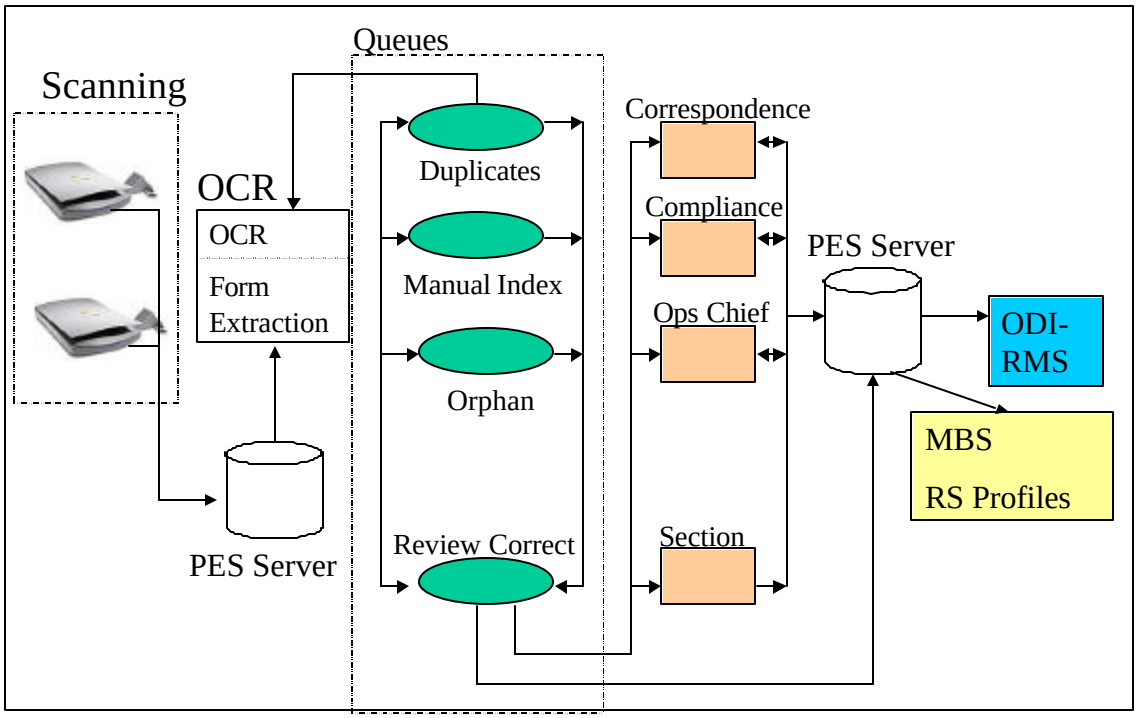
Currently over 80 percent of reporting officials use WinFE to complete the FITREPs, others complete the fitness reports using Formflow. MMSB receives over 175,000 fitness reports every year.

Since WinFE does not include digital signature capability, WinFE users must print the form on paper and sign before mailing to Headquarters, U.S. Marine Corps (Code MMSB). WinFE has been developed using PowerBuilder 6.0.

PES Back Office

Following the receipt of FITREPs at MMSB, paper based reports are hand fed into scanners. MMSB personnel compare the Section A information in the scanned fitness reports with MRO data stored in the operational data store. Improvements in the OCR technology have brought the FITREP review time down from six minutes to two-to-three minutes. The current system has achieved 87 percent accuracy in indexing FITREPs. Indexing is the reading and matching of four key fields on each page of the 2 or 5+ page FITREP. The system does not correctly index 13 percent of FITREPs because of discrepancies between the scanned information and the actual data. These discrepancies need to be manually corrected. The MMSB personnel fix orphans and errors and then the process is considered complete. The process is cumbersome and manual-intensive, and it does not take advantage of modern information technology practices.

Figure 2. Current PES Back Office Diagram



Source: MARCORSYSCOM

Procedure and Policies office at MMSB verifies the compliance of the FITREPs with completion guidelines of the Marine Corps. If some reports are identified as lacking in their compliance, a letter detailing the non-compliance is sent back to the reporting officials, along with the Fitness Report Discrepancy sheet.

Data is extracted from the images and stored in an Oracle database (PES DB) for inclusion in the Master Brief Sheet (MBS). The MBS is a ready reference document used in the personnel management process. The MBS provides key personal data and a summary of a Marine's performance evaluation record. The data from PES DB is also used to generate Reporting Senior (RS) profiles and produce a relative value for that Marine's report. The data may also be used to conduct statistical analysis, as needed.

The other output from back office is the FITREP image. FITREP images are forwarded to the Optical Digital Imaging-Records Management System (ODI-RMS) where they are stored as TIFF images in the Marine's Official Military Personnel File (OMPF).

PES Back Office has been developed using the following tools: PowerBuilder 6.0, Microsoft Visual Basic, C++ 5.0, Form Fix 2.8, Nestor Reader 5.0, Microsoft C++ 6.0, Oracle Enterprise 8.0.4, and LeadTools 10.0.

Critical Gaps

Manual, paper-based process

The performance evaluation process at Marine Corps requires comments from two or more officials. The current FITREP creation process, from initiation through completion, is manual-intensive. It requires reporting officials to manually deliver the paper-based documents or a file on floppy to each other. Hand delivery of the documents makes the process inefficient and time consuming. The Section A information which does not change every year, still needs to be filled and verified every time the FITREP is generated. Auto-population of Section A fields will make the process more efficient and less prone to errors. Once the reporting officials complete the FITREP, it is sent by postal mail to MMSB. This further adds delays to the overall process.

At the time of initial PES deployment, Web-based technologies and digital signature technologies were not yet mature or ready for mass adoption. Therefore, the current system utilized the client/server architecture and required reporting officials to hand-deliver the FITREPs.

Limitations of OCR technology'

While the OCR technology has improved over the years, there are still limitations on how effectively the scanner can read hand written documents. Once the FITREP is received at MMSB, it is scanned. The Section A data captured by the scanning process is compared with the data in ODSE. The current system has achieved 87 percent accuracy in indexing FITREPs. Accuracy of non-index fields is still a major problem. MMSB personnel manually correct the

discrepancies. The complete process can be automated through Web-based submission of FITREPs.

Lack of tracking capability

The current PES system lacks any tracking capability during the FITREP creation and review process. MROs do not know about the status of their FITREPs until the time they are received at MMSB. Similarly MMSB can not identify the bottlenecks in the current process, making it difficult to recommend and implement any improvements.

The Web-based workflow capabilities will enable reporting officials and MMSB to track the current state of FITREP and make the process more efficient and less cumbersome.
choices available.

Automated PES Functional Requirements

In order to address the gaps identified in the previous section and to streamline the performance evaluation process, Gartner has identified the following three core functional requirements in the automation of PES processes:

- Reduce/eliminate manual intervention in the overall performance evaluation process.
  - At front end, when reporting officials prepare FITREP
  - At back end, during scanning of paper-based source document.
- Provide automated workflow.
  - Eliminate paper-based, manual processes as much as possible
  - Reduce/eliminate discrepancies
  - Improve review time velocity
  - Streamline notifications for review and approvals.
- Security technology and features.
  - Signature requirements on the FITREP
  - Making sure that the person is who he/she claims to be.

Reduced Manual Intervention

Automating the FITREP initiation, completion and submission process can eliminate significant inefficiencies from the performance evaluation process. Process automation will eliminate the inherent delay in manual actions and will also considerably reduce (or eliminate) the requirement to complete Section A information on every FITREP.

Gartner has identified the following requirements for automation in FITREP initiation:

- The system shall provide the ability to complete MRO Worksheet and FITREP via Web without any proprietary downloads for viewing forms over the Internet. It should provide access to all Front-end PES application components through industry standard browsers.
- As the Web-based PES system will eventually be used by most of the Marines, it is important that the system be intuitive and easy to learn. To reduce learning time and training requirements, the system shall provide a user interface that is similar to other Web-based applications at Marine Corps.
- The system shall provide the capability to auto-populate Section A information from ODSE or other data repository as identified by Marine Corps. It should also allow reporting officials the capability to override any incorrect data that is auto-populated.
- The system shall provide MRO the capability to view last submitted report.
- FITREP has sections designated for the comments of RS and RO. The system shall provide record and file management capabilities and allow only the authorized personnel to create, update, read and if required, delete the FITREPs from the system.

- The system shall help and guide the reporting officials through out the PES initiation process. Good context sensitive help will accelerate the adoption of automated performance evaluation system across Marine Corps.
- It should provide spell check capabilities to ensure that the submitted FITREPs do not have errors and meet the professional standards of Marine Corps.
- The system shall provide the capability to mass-produce academic FITREPs.
- Automated PES shall build upon the existing business rules in current Windows FE 3.0.

Following are the automation requirements for back office processing:

- After the reporting officials complete their sections of the report, it should be submitted to the MMSB. The report status should change to "submitted to MMSB for review." MMSB personnel should then be able to retrieve the report and review it online.
- The system shall continue to provide MMSB personnel with the ability to query previously submitted FITREP data.
- If the reviewing process at MMSB reveals any discrepancies or non-compliance with the policies, the system shall provide the capability to highlight the areas of discrepancies and put the FITREP back into workflow with a status updated to "corrective action required by reporting officials."
- The system shall track all the changes made by reporting officials and the MMSB personnel to the report. At any point of time, it should be possible for the authorized personnel to track the versions and the changes made to the report.
- The system should continue to support the two current outputs, (1) Data extraction and storage to PES DB and (2) Generation of TIFF images of FITREPs for input to ODI-RMS.

Automated Workflow

One of the biggest bottlenecks in the current PES process is the manual workflow. The reporting officials hand-deliver the reports amongst each other. After the reporting officials complete the report, it is mailed to MMSB. These manual processes delay the final submission of the FITREP and make it difficult to track the report while it is being worked on.

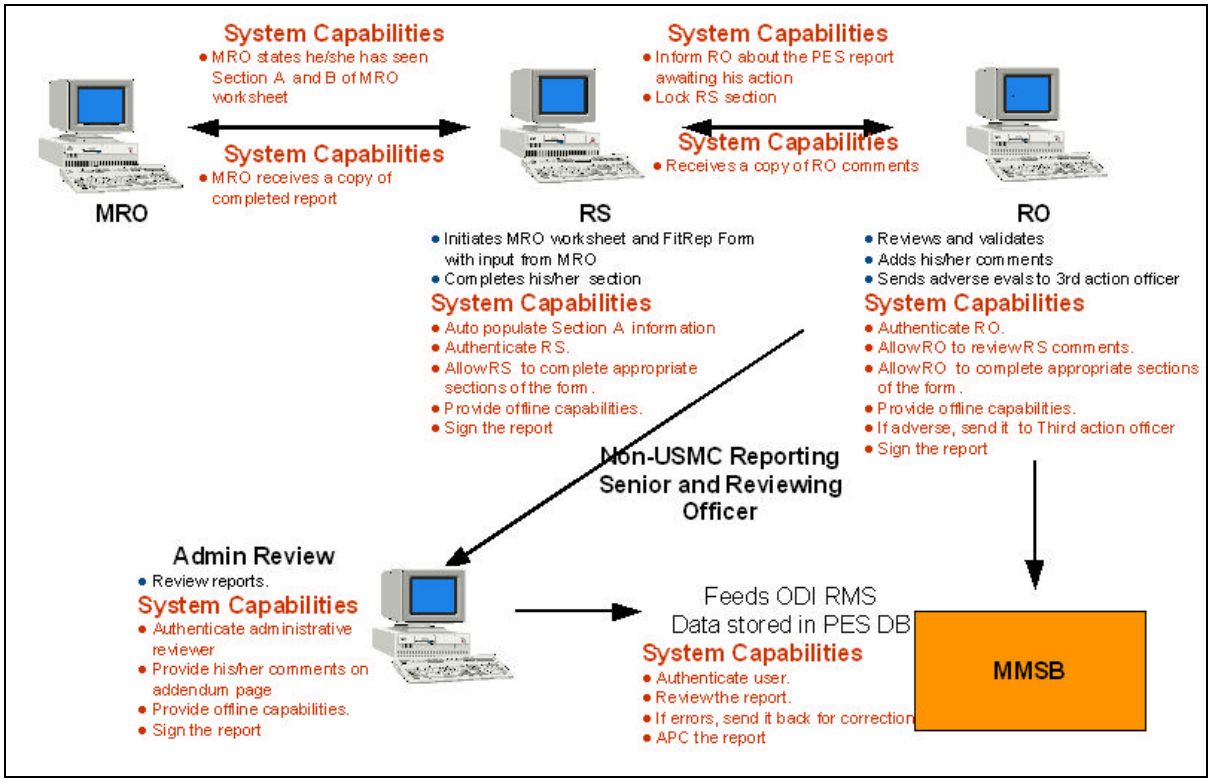
Web based workflow technologies have matured in the past few years and provide a very effective solution to reduce the above delays. It will also provide Marine Corps with the capability to track the reports while they are being worked on. Gartner has identified the following workflow requirements:

- System shall provide notifications to the reporting officials about the FITREP awaiting their response and prompt the required actions to be performed.
- It shall provide online tracking of status and also show the changes made to the report at each step from creation to completion.
- Paper based FITREP form provides clearly marked areas for the individual's actions. It clearly identifies the sections that must be completed by RS, RO and others. The online

system shall also provide similar capabilities. It shall lock all sections of FITREP, except the ones that the individual is expected to work on.

- Most of the workflow of this system will be pre-defined based on the reporting hierarchy of the Marines. In addition, the system should also provide the flexibility to support adhoc workflow, for some exceptional cases.
- The system should allow the command to add administrative personnel to the routing of the MRO worksheet/FITREP without additional signatures on the FITREP.
- It should be open enough to support new requirements that might evolve, for example, the use of business intelligence tools.

Figure 3. Automated PES Functional Diagram



Source: Gartner

Security Requirements

FITREP is one of the most important reports on which a Marine's future depends. An automated PES must provide a secure environment for Marines to complete this report.

- The system should capture signatures from key personnel involved in processing and reviewing of FITREPs. All reporting officials must sign the report. Specific digital signature capabilities are described under Technical Requirements.
- Identification of users should be required to gain initial access to the system. The identification may be achieved through the use of user ID and password. It should

establish permissions and/or access rights—such as read, write and update—associated directly or indirectly with the user ID (or assigned role).

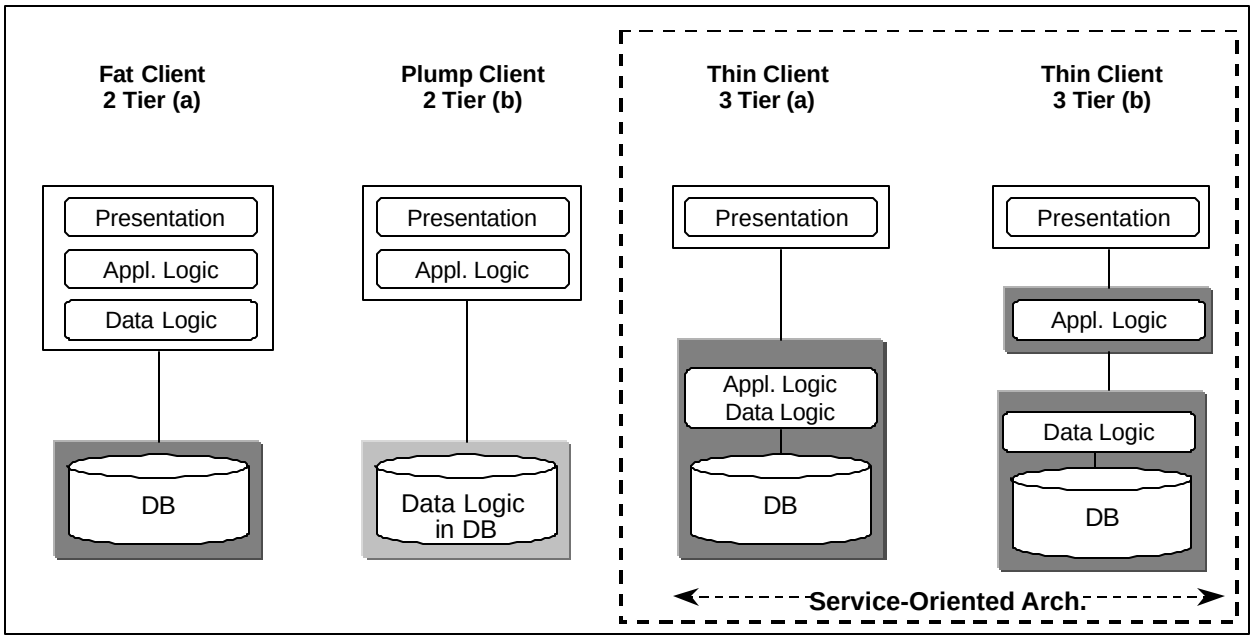
- The system should support authentication of user identity, by requiring them to offer proofs and credentials to verify they are who they claim to be.
- In order to prevent modification to mission critical fields and for the protection of MRO sensitive information, the system should provide the capability to lock the sections after receiving appropriate signatures.

Figure 3 shows FITREP initiation through completion process and highlights the key functional requirements of the system at each step.

Automated PES Technical Requirements

Automated PES should use a "component-based, service-oriented architecture." The application presentation layer should run in a browser utilizing a thin client approach, as illustrated on the right side of the figure below.

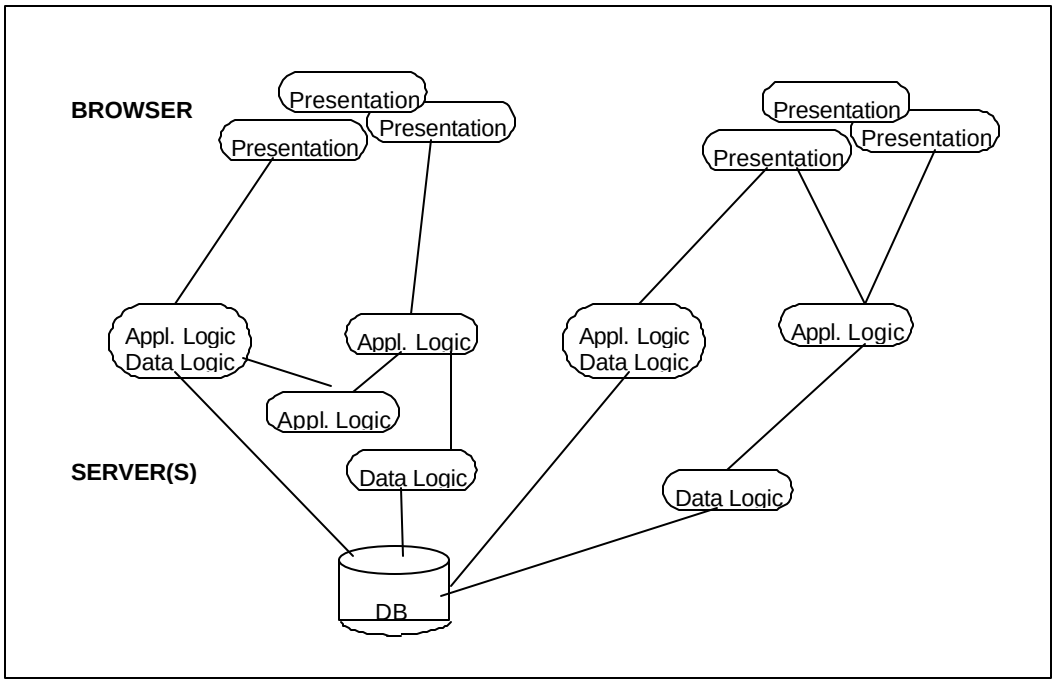
Figure 4. Application Partitioning



Source: Gartner

The above diagram shows the partitioned program categories: presentation, application logic and data logic, and how they relate to each other. An application can be constructed with many implemented modules in each category. We can visualize an application constructed with a component-based architecture with the help of the next diagram:

Figure 5. Application Components



Source: Gartner

Applications designed with a service-oriented architecture benefit from improved design scalability, modular development, testing, etc. The cost to develop and maintain is significantly lower.

Automated PES should be developed to advanced n-tier architecture based on principles such as:

- A "thin client" software architecture
- A service-oriented architecture that emphasizes reusable components
- Application services executing on a centrally managed server complex
- Applications hosted on leading application server supported by E-forms vendors.
- A central Oracle database, which is relational and normalized
- Leading Web servers supported by E-forms vendors
- Provide high availability via redundant sites.

Based on the discussions with PES stakeholders, results of focus groups and current technology trends, Gartner has identified the technical requirements for automated PES. The technical requirements are organized under following categories:

- Presentation layer requirements
- Services layer requirements

- Information layer requirements
- Security requirements

Presentation Layer Requirements

The presentation layer (client) of automated performance evaluation system should:

- Provide complete functionality using industry standard browsers (Netscape and Internet Explorer), the functionality available through these browsers should only be constrained by DoD/DoN/USMC/NMCI guidelines.
- Support device and platform independence so that the Marines can access it from any computer using any operating system, like Windows, Mac OS and Unix.
- Not require any proprietary download for viewing, editing or submitting forms over the Internet.

Services Layer Requirements

Services layer should support the application and data logic of the application. The requirements include:

- Support workflow engine and/or business process manager.
- Provide workflow integration with existing e-mail systems, so that reporting officials can be informed about any FITREPs awaiting their action.
- Support application integration using industry standards (e.g., XML).
- Database connection management should be supported through application server to allow large number of Marines to simultaneously access the application.
- Support standard database access protocols like ODBC and JDBC.
- Provide access to PES DB.
- Provide access to operational data store (ODSE) for Section A information.
- Import reporting hierarchy information from HR systems or LDAP directory.
- Provide FITREP images (tiff files) to Optical Digital Imaging - Records Management System (ODI-RMS).
- USMC plans to provide PKI certificates using the DoD Common Access Card (CAC). In order to authenticate users, the system should provide capability to integrate with DoD CAC readers that will be installed on desktops.

Information Layer Requirements

Data from PES will reside in information repositories that comprise the information layer. These repositories include LDAP directory, PES DB, ODI-RMS data store, ODSE and the digital signature data store. Information layer requirement include:

- Ability to leverage current PES DB structures, schema and records with minimal changes.
- Ability to store and maintain data required to support digital signatures.
- Compliance with Marine Corps data archival policies.
- Provide input to generate Master brief sheet (MBS).
- Provide input to ODSE.
- Accessibility to conduct statistical analysis.
- Scalability to support more than 175,000 reports every year.

Security Requirements

USMC plans to issue PKI certificates to all Marines on DoD Common Access Card. Automated PES system will be required to comply with DoD PKI policy. Other security requirements include:

- Comply with Federal Electronic Signature Act.
- Interoperate with DoD Common Access Card (CAC) or other DoD approved hard token.
- Comply with DoD Class 3 PKI Public Key enabled application requirements.

At present only a few thousand PKI certificates have been issued at USMC; the proposed plan is to issue PKI certificates to all Marines by October 2002. The automated PES should be able to provide a secure environment, and meet all Security functional requirements described in the Security Requirements sub-section of the Automated PES Functional Requirements. The selected vendor for PES implementation should demonstrate the vision to comply with DoD PKI policy as it evolves over the years.